DOCUMENT RESUME

ED 339 208 FL 019 787

AUTHOR Mikkonen, Valde; Service, Elisabet
TITLE Working Practices at School, Memory Use, and Foreign Language Learning.
PUB DATE 85
NOTE 14p.; In: Sajavaara, Kari, Ed., and others. Finnish Psycholinguistic Papers V, Association of Applied Linguistics, Finland. p97-109. 1985.
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Applied Linguistics; Classroom Techniques; Elementary Secondary Education; Foreign Countries; Grade 1; High School Students; *Learning Motivation; Memorization; *Memory; Reading Comprehension; *Recall (Psychology); Second Language Instruction; Second Language Learning; *Second Languages; *Student Attitudes; Testing
IDENTIFIERS *Finland

ABSTRACT

Three empirical studies concerning reflective and rote learning in Finnish schools are described. In the first, a questionnaire given to school beginners reveals that during their first 12 weeks of school the children's estimates of the excitement and pleasure of learning and their conception of the role of understanding in learning decrease. The second study compared the achievement of high school students learning either a normal text or a text with paragraphs in random order. Results suggest that a text requiring greater effort at the reading stage may result in better delayed recall even if a less demanding text results in better immediate recall. The third study concerns performance on the Finnish school-leaving examination. Students who used their memory in a reconstructive way to answer essay questions appeared to do better in all of the subtests when compared with pupils who reproduced portions of their textbooks from memory. Based on these findings, some classroom instructional activities that could increase learning effort in the foreign language classroom are suggested. A brief bibliography is included. (MSE)

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WORKING PRACTICES AT SCHOOL, MEMORY USE AND FOREIGN LANGUAGE LEARNING

VALDE MIKKONEN and ELISABET SERVICE

University of Helsinki

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ABSTRACT

Three empirical studies concerning reflective and rote learning are described. In the first study a questionnaire given to school beginners reveals that during the first twelve weeks of school the children's estimates of the excitement and pleasantness of learning go down, and their conception of the role of understanding in learning decreases. The second study compares the achievement of high-school pupils learning either a normal text or a text with the paragraphs in random order. The results suggest that a text which requires greater effort at the reading stage may produce better results in a delayed recall test even if a less demanding text results in better performance in an immediate recall task. The third study deals with matriculation examination results. Pupils who use their memory in a reconstructive way to answer essay questions seem to do better in all the tests of the matriculation examination compared with pupils who reproduce chunks of their textbooks. Finally some tasks are suggested that should increase learning effort in the foreign-language classroom.

Some decades ago tuition in German was introduced into the curriculum at the experimental communal secondary school in Suomussalmi. Not everybody had a book of their own, and words had to be acquired aurally. The tests, however, required writing. The teacher would read out words in Finnish. These had to be written down together with the German equivalents. The teacher faced some difficulty in grading the paper by one the authors (V.M.), for he counted errors in terms of the number of incorrect letters. The paper did not contain a single approximation to a German word. All the words had been written according to Finnish spelling conventions and could

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only be recognized as German words when read out. The teacher decided that a score for the test could not be given as the pupil had not understood the rules of the game.

The rules of the game were: the word had been learnt only if it could be correctly spelt letter by letter. The episode described above seems humorous today. Someone might think it mediaeval if the time and place were not given. It could be claimed, however, that school work has the same flavour even today.

Quick adaptation by school beginners

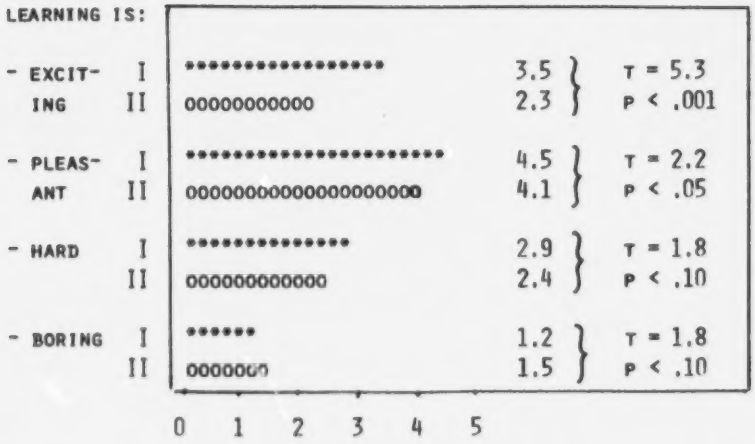
Leila Kuusela (1983) investigated school beginners' conceptions of learning. The children received questionnaires specially designed so that their completion did not require reading ability. Soon after the start of school (in the second and third weeks) and at the end of the term (in the tenth, eleventh and twelfth weeks) the first-formers were asked how they felt about learning, and which of a number of suggested activities they thought they were learning.

The changes in the conceptions of learning were not especially large described in common language terms, but they were still interesting. Figure 1 shows the changes in children's estimates for the four features that gave rise to the greatest differences between the two measurement dates.

As can be seen, the children perceive learning as less exciting, pleasant or difficult after 10 weeks of school, and regard it slightly more boring than before. The result is statistically significant for the first two features in the sample of 55 children.

This result of course does not tell us anything about memory use at school, nor is it related to the emphasis on mechanical memory performance in school work. The children did, however, receive other tasks as well. They had to rate 38 different descriptions of activities or situations in terms of their being examples of learning. The descriptions were short, e.g. "Looking for differences in pictures is learning" or "Doing your homework is learning". The content validity of the estimates was checked by including descriptions like "Getting a school-bag is learning" or "Sitting at the front of the class describes learning".

The descriptions fell into four categories. Statements in the first category emphasized understanding, the second group emphasized remembering, the third emphasized some overt learning activity, and the fourth described activities other than learning. Of the examples given above,



MEAN ESTIMATES ON A 6-POINT SCALE (0-5) IN THE SECOND (*) AND ELEVENTH (o) WEEKS AFTER SCHOOL START.

FIGURE 1. SHOOL STARTERS' ESTIMATES OF THE ATTRIBUTES OF LEARNING; WHAT IS LEARNING LIKE? THE GROUP (N = 55) MEANS AND THE STATISTICAL SIGNIFICANCE OF THE DIFFERENCES BETWEEN THE TWO CONSECUTIVE ESTIMATES. (KUUSELA 1983).

"looking for differences" emphasizes understanding; "doing your homework" belongs to the category of an overt activity, while the two others do not describe learning. Emphasis on remembering was represented by sentences like "Remembering the words of songs is learning" or "Knowing something by heart describes learning".

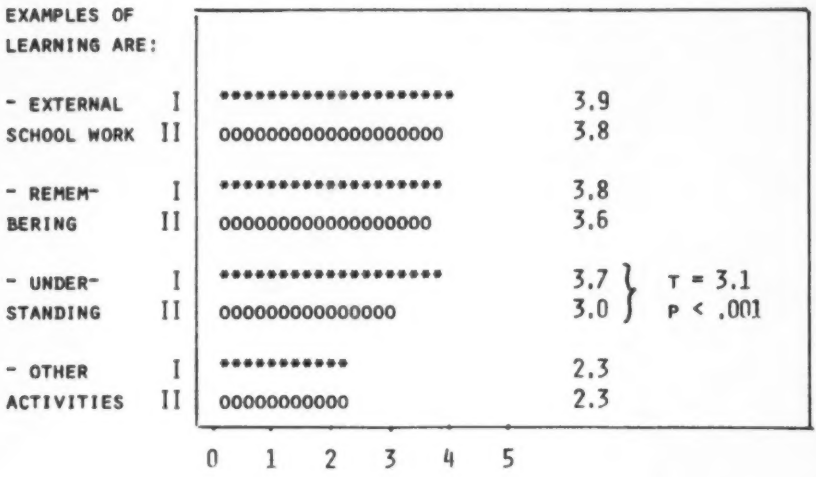
The average ratings for the different kinds of descriptions on the two measuring occasions can be seen in Figure 2. It shows that the ratings of most descriptions are slightly lower on the second occasion, but the clearest, and statistically significant, difference appears in the descriptions dealing with understanding. Even during their first months at school children increasingly begin to see learning as something else than understanding.

The validity of the children's answers can naturally be questioned, but the responses are highly consistent and descriptions of activities other than learning received lower ratings on an average. The latter category does, however, include a few descriptions that the children clearly regarded as learning, like "making a cake", "visiting the library", "putting one's hand up" and "taking part in a competition". It is quite acceptable that these things should be viewed as learning by the children. Their ratings do not, however, change during the first term. This supports the conclusion that the lower ratings obtained at the end of the term for descriptions which emphasize understanding reflect a real change in children's conceptions.

The level of effort in reading

Everyday experience tells us that a piece of advice received from someone else is harder to remember than an understanding reached as a result of personal effort. At school, teaching materials and instruction mostly offer ready-made conceptualisations and conclusions to be acquired. This might not be optimal at least in view of the long-term availability of what has been learnt. Kristiina Onnelainen (1984) did an experiment to explore this with high-school students.

In the experiment the students were asked to study some five pages of text dealing with professions in computing. A pilot study had revealed that approximately half of the students were interested in the text. Half of the students received the text in its original well-structured form. The other half got the paragraphs in random order. The pupils had to answer questions based on the text immediately after reading the text and a second time about



MEAN ESTIMATES ON A 6-POINT SCALE (0-5) IN THE SECOND (*) AND ELEVENTH (o) WEEKS AFTER SCHOOL START.

FIGURE 2. SCHOOL STARTERS' ESTIMATES ABOUT WHAT BELONGS TO LEARNING; TO WHAT EXTENT ARE THE THINGS MENTIONED LEARNING? GROUP (N = 55) MEANS AND THE SIGNIFICANCE OF CONSECUTIVE ESTIMATES. (KUUSELA 1983).

EXAMPLES OF THINGS ESTIMATED UNDER THE HEADINGS:
- EXTERNAL SCHOOL WORK: "DOING YOUR HOMEWORK"
- REMEMBERING: "KNOWING RHYMES BY HEART"
- UNDERSTANDING: "LOOKING FOR DIFFERENCES IN PICTURES"
- OTHER ACTIVITIES: "VISITING THE LIBRARY"

a month later. These included questions demanding production (e.g. "Compare the work of an EDP planner and a system planner") and multiple choice tasks.

The experimental design resulted in the formation of four groups, which all participated both in the immediate recall task and the delayed recall task. The groups and their average results as percentages of the maximum score are shown in Figure 3.

Not much forgetting seems to be taking place, but that can be attributed to the tasks used to measure it. The second test was shorter and included easier items. In fact the two tests were designed to give about equal scores, which would make them sensitive as indicators of the phenomena being studied here. The most interesting result is the interaction between type of text and interval between learning and recall: the text is best acquired for immediate recall if it is well-structured. Recall after a longer period is, however, better if the text is rather poorly structured. We may speculate that there are differences between the groups in the level of elaboration at the reading stage. The well-structured text can be acquired as such, whereas the poorly structured text demands processing in depth and may lead to a more personal memory structure.

Memory use in the matriculation examination

The Finnish school-leaving exam is intended to be a test of what has been learnt during the high-school years. In many schools success in this exam is considered to be a central goal. It appears that habits of memory use affect success in exams. This was investigated by classifying approximately 700 answers to an essay question on psychology in the 1979 matriculation examination according to the kind of memory use they reflected. The following three groups could be distinguished among the essays on the topic "Experimental Deprivation Situations and their Effects" (Mikkonen & Leikola, 1982):

Idiosyncratic. The essay is based on an analysis of the title and does not include reproduction of parts of the textbook. The answer is construed on fairly scanty memory material. These essays made up about 20 % of the whole material.

Elaborative. The essay describes one typical experiment which the student elaborates on by searching for parallels and analogies. Memorised material is used as a core or schema in constructing the answer. These essays made up 40 % of the total.

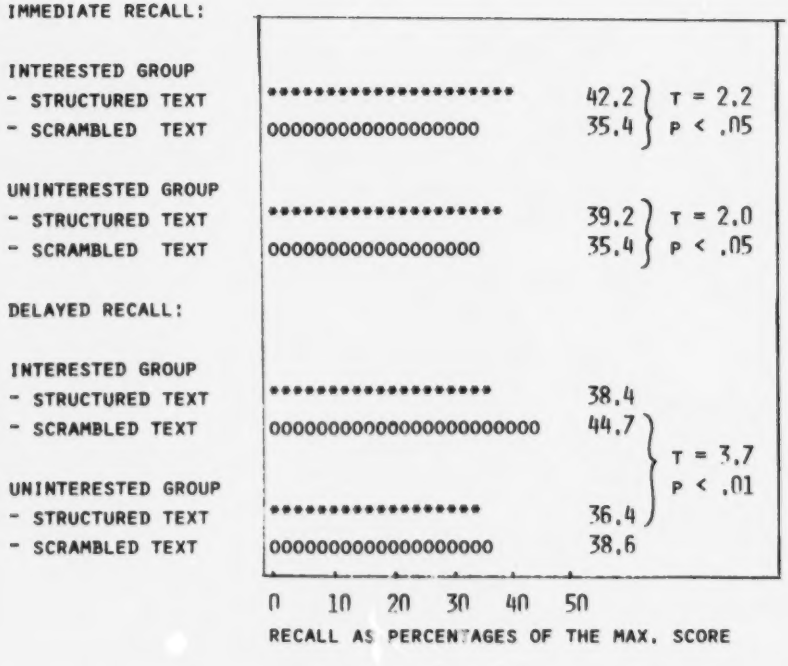


FIGURE 3. AVERAGE RECALL OF TEXT CONTENTS FOR THE INTERESTED AND UNINTERESTED GROUPS USING A WELL-STRUCTURED OR A POORLY STRUCTURED TEXT. IN IMMEDIATE RECALL THE WELL-STRUCTURED TEXT LEADS TO A SIGNIFICANTLY BETTER RECALL, IN DELAYED RECALL THE POORLY STRUCTURED TEXT GIVES RISE TO THE BETTER RESULT. (ONNELAINEN 1983).

Reproductive. The essay fairly faithfully reproduces the relevant part of the textbook and attempts nothing else. These essays made up 40 % of the material.

The labels given to the groups above are for mnemonic purposes only and obviously unduly accentuate the differences between the groups. Success in the various tests of the matriculation examination, and some combined measures based on these tests were checked for the different groups. The differences discovered between the groups are shown in Figure 4.

Success varies systematically so that the elaborative group manages best in all tests. The differences between this group and the reproductive group are significant for all the measures used. The idiosyncratic group falls between the two others, but its success, too, is significantly better than that of the reproductive group on many subtests.

Even a good ability to recall textbook passages as such fails to guarantee successful performance in the matriculation examination. It is somewhat surprising that this kind of memory use is associated with lower marks even in those sections of the language tests - listening and reading comprehension - which are solely based on multiple choice questions. Better results are achieved through the elaboration of remembered material by drawing inferences, or through the construction of answers without any attempt at exact recall.

A summary of the results on memory use in school

The empirical results reviewed above suggest that:

- As early as the first term, the school beginners' conception of what constitutes learning narrows down in the direction of remembering and external school work at the expense of activities describing understanding.

- The use of well-structured material may be favourable for immediate retention, but for longer-term storage it is better if the material requires personal effort by the learner to analyse the contents and find the message.

- Success in the matriculation examination is associated with the use of remembered material as a starting point for inferences and elaboration, rather than with direct recall.

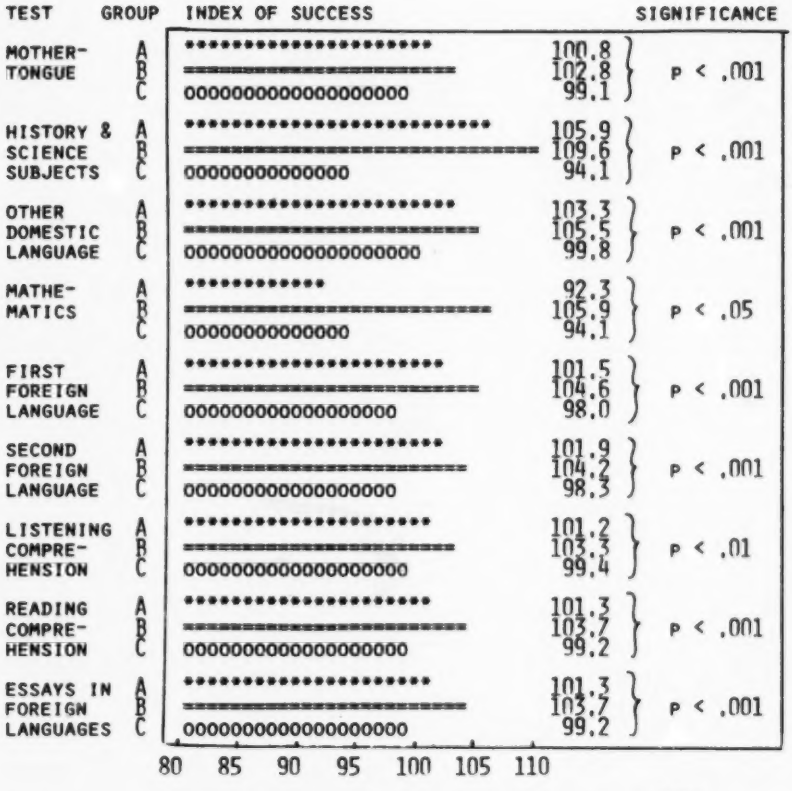


FIGURE 4. THE SUCCESS OF THE THREE GROUPS IN DIFFERENT TESTS OF THE MATRICULATION EXAMINATION. THE GROUPS DIFFER IN TYPE OF MEMORY USE REFLECTED IN THE EXAMINED PSYCHOLOGY ESSAY: A STANDS FOR THE IDIOSYNCRATIC GROUP, B THE ELABORATIVE GROUP, AND C FOR THE REPRODUCTIVE GROUP.

The obvious conclusion is that the constructive use of memory should replace reproductive use in school work. How this can be achieved is, however, not known. It is possible that the constructive grasp can be best achieved by first aiming at perfect reproduction. But it is also possible that success based on reproduction only - which presumably is possible in school - gives rise to fixed ways of learning, so that constructive memory use can never be achieved.

Obstacles to the development of more effective memory use are better known: learning is mostly achieved using well-structured materials, which favour direct remembering; the time allowed for acquisition is short and even the goals might involve reproduction only. The development of more effective ways for memory use might be quite favourable if the obstacles to it were minimised in school work.

Everyday practice in Finnish schools still seems to favour direct memorisation and the reproductive use of memory, even though both teachers and students are well informed of its drawbacks.

Deepened processing in foreign language learning tasks

The results of the analysis of the matriculation examination essays suggest that some pupils tend to do more mental work than others, measured in terms of depth of processing. They also suggest that this habit is transferred to foreign language learning at school as well as to other subjects. As mental effort seems to be beneficial to the outcome of learning, all pupils should be acquainted with it. This probably calls for conscious effort on the part of the teachers of different subjects. What then could a language teacher do to teach his pupils deeper processing?

The traditional method of learning foreign language vocabulary is to repeat lists of foreign words and their mother-tongue equivalents either aloud or silently to oneself. A richer net of associations could be created around the new word by using the interactive image mnemonics employed and described by performing mnemonists and adapted to foreign language learning by Atkinson (1975). The method requires the learner to think of a key-word in the mother tongue which sounds like the word to be acquired. The following step is to form an image in which the meanings of the two words interact. For example a Finn trying to learn the English word "ghost" might think of the Finnish word "kostea" (damp) and visualise a ghost in a damp dungeon, dripping with water and breathing out steam. Seeing or hearing the Finnish word for ghost, "kummitus" should now evoke the pictorial image, which

should bring to mind the word "kostea", which in turn should remind the learner of the similar-sounding "ghost". This kind of exercise in vocabulary learning could be done in class-room surroundings (see Kasper, 1983) or at home by individual students, even using a microcomputer.

A well-known feature of vocabulary teaching in most schools is the attempt to keep the learners' active vocabulary at the same level as the passive one. This is done by demanding that the students are able to use productively all the words they have encountered. This of course limits the vocabulary used in most teaching texts to a bare minimum of the most frequent words in the language. It seems to us that it would be more useful to prepare the students for real language outside text-books by forcing them to develop their ability to tolerate unknown words in a text and guess their meaning. Laura Walker (1983) was able to distinguish at least ten different strategies for guessing words in her experimental investigation. Some of these were more efficient than others. Exercises designed to train word identification skills make the students actively think about textual cues, semantic context, etc. Thus they probably lead to deeper processing of the words, and activate different kinds of knowledge of the language to be learnt.

Semantically empty markers like the genders of nouns or the declinations of verbs are difficult to remember in many languages, if they are merely repeated by heart. Why not ask the students to invent their own mnemonics for memory support? These might involve underlining in different colours, the formation of images or whatever they can think of. The ability to produce one's own memory rules might be more valuable in the future than knowledge of the rules just being taught.

Foreign language structures have mostly been taught through repeated drilling, guided either by a rule or models given by the teacher. Even this task could be made to require more activity on the part of the learner. Pupils could be asked to find out the similarities and differences between two given structures used in a text. This could be done separately on the syntactic, semantic and pragmatic levels. Students could also analyse language usage in poetry, newspaper articles, pop songs, etc. The main thing is that they do something more than just repeat the constructions.

As with vocabulary, the teaching of syntactic structures has also been aimed at keeping active knowledge abreast with passive knowledge. But if we demand that the students start producting complex constructions as soon as they first come across them, there will be no time left for student-centered learning. Only the teacher knows how the structures are formed and when they

can be used. If instead we give the students some experience with the construction to be learned before requiring production, we can make it the pupil's task to find out the rules. The pupils could for instance be asked to collect occurrences of a given construction over a period of a week or even a whole term, before they are asked for a report. Only after this would production be expected.

Students could also be activated to make grammar rules easier to memorise. They could, for example, think of sentences which demonstrate a given rule and deal with a special theme, e.g., "Daddy in the kitchen" and then invent others where the rule does not apply and where the theme is different, e.g. "the baby in the bath". Rules could also be modified by the pupils to cover whatever material has recentely been encountered, and pupils should be encouraged to look for exceptions. After all, discovering the grammar of a new language can be an adventure quite comparable with many artificial problem-solving tasks.

Expressions suited to carrying out specific speech functions are often taught as lists. Memorising lists is not very useful if the aim is to learn communicative skills. Instead pupils could be asked to make up texts or dialogues, which include such expressions, or they could fill in the speech bubbles of comic strips.

The development of text comprehension is perhaps not altogether hampered by always giving the translations of difficult words, but this might result in the student feeling rather helpless, when no dictionary is at hand. The students' ability to make inferences based on linguistic or pragmatic cues that would help them to understand unfamiliar sentences should be specially developed. Tasks demanding the continuation of sentences or asking the students to list possible inferences from them (cf. Laurinen, 1981) could be of use here.

Barry McLaughlin et al. (1983) distinguish between controlled and automatic processes in language use and language learning. The controlled processes are flexible, often conscious and demand working-memory capacity. The automatic processes, on the other hand, are learned, fluent programs, which mostly escape conscious inspection and hardly demand any controllable capacity.

Optimal language use requires the use of controlled as well as automatic processes. At the beginning of learning there are, however, only controlled processes, so the capacity load is considerable. The exercises suggested above also develop controlled processes at first. When, however, one learning point is practised in many different ways, and not just re-

peated in a stereotyped fashion, the result should be flexible language use based on automatised subprocesses. Of course, automatisation itself can be enhanced by specific tasks developing reaction speed. Language laboratories, computer-assisted learning, many games, etc. are well suited to this. Once such lower-level processes as pronunciation and rule-governed syntax are automatic, the controlled processes can be directed at higher-level decision-making in language comprehension and production.

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